COVID-19 in Children: Worsening Outcomes during Delta Variant Wave

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BACKGROUND

- Over 12 million children have tested positive for SARS-CoV-2 since the start of the pandemic.
- Little is known about the impact of different variants of SARS-CoV-2 on children.
- We leveraged the Children and COVID-19 in Colorado study database to examine differences among children requiring hospital admission due to the SARS-CoV-2 Delta variant vs. wild type virus.

METHODS

- Retrospective review of the first admission for pediatric patients <21 years of age hospitalized at Children's Hospital Colorado with detectable SARS-CoV-2 NAAT and symptomatic COVID-19.
- Children meeting case definition for MIS-C who had detectable SARS-CoV-2 NAAT were included.
- Intensive care (ICU) included all pediatric and cardiac ICU admissions, and neonatal ICU admissions only if the patient required greater respiratory support than low flow oxygen.
- We defined the Pre-Delta period as March-November 2020 and the Delta period as June-September 2021.
- We compared variables using Fisher's exact or Pearson's chi square tests for categorical variables and Wilcoxon rank sum tests for continuous variables.

RESULTS

Table 1. Demographics and outcomes of symptomatic hospitalized children

		Pre-Delta period (Mar-Nov 2020) N=119	Delta period (Jun-Sep 2021) N=137	p-value
DEMOGRAPHICS	Male	65 (54.6%)	72 (62.6%)	0.80
	Age (y); median (IQR)	12.2 (1.5-16.9)	5.9 (1.0-14.5)	**0.02**
	Hispanic	70 (62.0%)	50 (41.7%)	
	Non-Hispanic white	24 (21.2%)	47 (39.2%)	**0.04**
	Non-Hispanic other	19 (16.8%)	23 (19.2%)	
	English-speaking	81 (68.1%)	124 (90.5%)	
	Spanish-speaking	34 (28.6%)	10 (7.3%)	**<0.0001**
	Other language	4 (3.3%)	3 (2.2%)	
OUTCOMES	Length of stay (days); median (IQR)	3 (1-6)	2.5 (2-4)	0.21
	Intensive care	28 (23.5%)	50 (36.5%)	**0.03**
	Any respiratory support	60 (50.4%)	80 (58.4%)	0.21
	Low flow O2	35 (58.3%)	38 (47.5%)	
	High flow O2	5 (8.3%)	11 (13.7%)	
	NIPPV	9 (15.0%)	21 (26.3%)	0.31
	Ventilator	9 (15.0%)	9 (11.2%)	
	ECMO	2 (3.3%)	1 (1.3%)	

During the Delta wave of COVID-19, children hospitalized with symptomatic SARS-CoV-2 were ***more likely to require ICU admission*** compared to children hospitalized when wild-type SARS-CoV-2 was circulating.

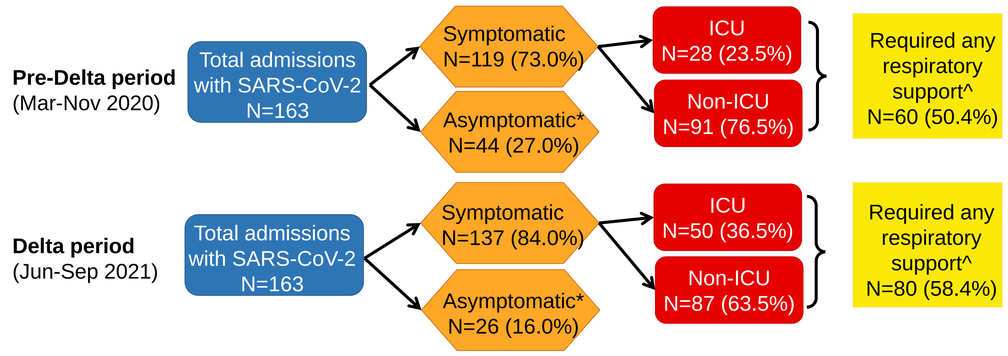

Figure 1. Patients hospitalized with SARS-CoV-2.
*Asymptomatic patients were admitted for an unrelated reason and tested positive for SARS-CoV-2 incidentally.
^Patients who required respiratory support are reported as a proportion of all symptomatic patients.

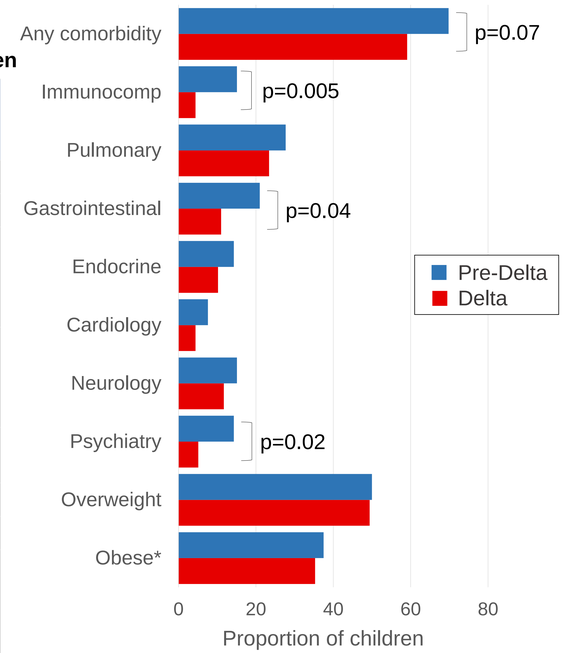

Figure 2. Underlying comorbidities of symptomatic hospitalized children with SARS-CoV-2
*Obese are a subset of overweight.

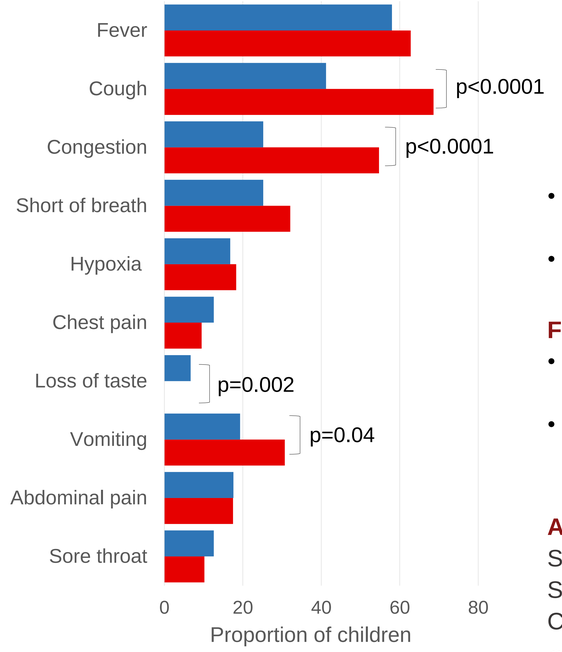

Figure 3. Presenting symptoms of symptomatic hospitalized children with SARS-CoV-2

Table 2. Multisystem Inflammatory Syndrome in Children (MIS-C) diagnoses among hospitalized children with detectable SARS-CoV-2 NAAT

	Pre-Delta period (Mar-Nov 2020) N=119	Delta period (Jun-Sep 2021) N=137
MIS-C diagnosis	3 (2.5%)	4 (2.9%)
MIS-C with ICU admission	3 (2.5%)	2 (1.5%)

CONCLUSIONS

- Compared to children hospitalized when wild type SARS-CoV-2 was circulating, children hospitalized during the Delta variant surge were:
  - Younger, which may reflect increasing vaccination rates among older children and adolescents later in the pandemic;
  - Less likely to identify as Hispanic or Spanish-speaking, which is consistent with the changing demographics of the pandemic that we have observed in Colorado;
  - More likely to present with cough, congestion, or vomiting, and less likely to present with loss of taste, which may reflect an increased likelihood of the Delta variant to present with upper respiratory symptoms;
  - Less likely to have underlying comorbidities, especially immunocompromising, gastrointestinal, or psychiatric conditions, which may reflect an increased propensity for the Delta variant to cause severe disease requiring hospitalization even among previously healthy children;
  - More likely to require ICU admission, which may reflect increased severity of the Delta variant in the pediatric population.
- MIS-C did not account for the higher rates of ICU admissions in the Delta period.
- Close monitoring of pediatric outcomes is needed as new SARS-CoV-2 variants emerge.

FUTURE DIRECTIONS

- Further comparison of pediatric demographics and clinical outcomes during Omicron variant surge
- Determination of the proportion of vaccine-eligible children who were vaccinated at the time of hospitalization

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CONTACT INFORMATION

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